



HARTCROWSER

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January 21, 2000

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Coeur d'Alene Field Office

Anchorage

Mr. Gregory A. Rapp
Construction Services Manager
Potlatch Corporation
1100 Railroad Avenue
P.O. Box 386
St. Maries, Idaho 83861

Boston

Chicago

Re: Fourth Quarter 1999 Performance Report
Avery Landing Recovery System
J-2296-07

Denver

Dear Mr. Rapp:

Hart Crowser is pleased to present the Fourth Quarter 1999 Performance Report for the Avery Landing free product recovery system. This letter report presents the fourth quarter groundwater elevations, product thickness measurements, and recovered free product volume.

Fairbanks

GROUNDWATER AND PRODUCT QUARTERLY MONITORING

Jersey City

Four extraction wells (EW-1 through EW-4), two piezometers (P1 and P2), and three monitoring wells (HC-4, MW-5, and MW-11) were monitored on December 2, 1999. Well and piezometer locations are shown on Figure 1. Monitoring well HC-1 was below standing water and was not measured. At each monitoring location, depth to product and depth to groundwater measurements were performed using a Flexidip, a free product measuring device. River elevations, based on actual data from EW-2 and the average slope of the river, are noted in Table 1. The Third Quarter 1999 Performance Report provided an explanation for the use of calculated river elevations when conditions do not favor direct measurement.

Juneau

Long Beach

EXTRACTION WELL OPERATION

Though the extraction system was running and maintaining a trough for free product to capture, it was not maintaining absolute capture. During normal operation the bottom of the trough created by the pumping system is lower than the river elevation. During periods of low river flow it is normal for the river elevation to be less than the trough bottom. This

Portland

Seattle



monitoring event is the first time, when the system was operating properly, that we have seen the river level lower than the trough during the "wet" season. We feel this was caused by the rapid fluctuating river level during the last monitoring event. The local Potlatch representative, Don Green, indicated the river had been fluctuating 4 to 5 feet in the month of November. This will be documented by the USGS data when they are released in 6 months. When the river level decreases quickly the groundwater level lags behind. The pumping system is not able to depress the groundwater level as fast as the river fluctuates. The effect of this is that the oil that was already past the treatment trench has a tendency to flow toward the river instead of the trench. This oil is then captured in the oil booms along the river bank. Possible system modifications to minimize the dependency of system on the oil booms will be discussed in the yearly report.

FREE PRODUCT RECOVERY

The treatment system recovered approximately 5 gallons of free phase hydrocarbons since the September 1999 monitoring event and has collected roughly 25 gallons of free phase hydrocarbons during the 1999 operating period. The volume of product collected during the fourth quarter is a conservative estimate based on the thickness of the product layer in the free product storage tank. Recent removal of water from the storage tank decreased the liquid level within the tank and resulted in free product collecting on the tank walls. The volume of free product on the tank walls is expected to be approximately 5 gallons.

PROJECT SCHEDULE

This performance evaluation concludes monitoring activities at the site for the 1999 project year. The 1999 Annual Summary Report will be submitted by February 5, 2000.

LIMITATIONS

Work for this project was performed, and this letter report prepared, in accordance with generally accepted professional practices for the nature and conditions of the work completed in the same or similar location, at the time the work was performed. It is intended for the exclusive use of the Potlatch Corporation for specific application to the referenced property.



Potlatch Corporation
January 21, 2000

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If additional information or clarification is required, please call Terry Montoya at
(206) 324-9530.

Sincerely,

HART CROWSER, INC.



TERRY MONTOYA
Project Engineer



MATT SCHULTZ, P.E.
Senior Associate Engineer

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Attachments:

Table 1 - Avery Landing Groundwater and River Monitoring Data

Figure 1 - Avery Landing Fourth Quarter Groundwater Flow Direction Map

cc: Kreg Beck, Idaho Department of Environmental Quality

Table 1 - Avery Landing Groundwater and River Monitoring Data

Monitoring Location	Date	Depth to Product	Depth to Water	Product Thickness	T.O.C. Elevation	Groundwater Elevation
EW-1	10/27/94	ND	11	0	95.34	84.34
	6/30/95	ND	10.9	0	95.34	84.44
	9/21/95	11.25	11.27	0.02	95.34	84.07
	7/11/96	ND	9.74	0	95.34	85.60
	9/11/96	ND	10.88	0	95.34	84.46
	11/5/96	ND	11.94	0	95.34	83.40
	7/17/97	ND	10.38	0	95.34	84.96
	10/9/97	ND	13.17	0	95.34	82.17
	6/25/98	ND	10.01	0	95.34	85.33
	8/12/98	NM	10.52	0	95.34	84.82
	10/22/98	Sheen	10.86	0	95.34	84.48
	3/18/99			0	95.34	85.57
	6/22/99	ND	11.68	0	95.34	83.66
	9/16/99	ND	10.72	0	95.34	84.62
	12/2/99	ND	9.78	0	95.34	85.56
EW-2	10/27/94	ND	10.37	0	95.24	84.87
	6/30/95	10.57	10.89	0.32	95.24	84.35
	9/21/95	13.9	13.92	0.02	95.24	81.32
	7/11/96	11.03	11.66	0.63	95.24	83.58
	9/11/96	Sheen	14.00	0	95.24	81.24
	11/5/96	Sheen	12.27	0	95.24	82.97
	7/17/97	8.99	9.09	0.1	95.24	86.15
	10/9/97	Sheen	15.44	0	95.24	79.80
	6/25/98	9.19	9.64	0.45	95.24	85.60
	8/12/98	NM	9.99	0	95.24	85.25
	10/22/98	Sheen	10.94	0	95.24	84.30
	3/18/99	10.17	10.27	0.1	95.24	84.97
	6/22/99	11.3	11.31	0.01	95.24	83.93
	9/16/99	15.32	15.35	0.03	95.24	79.89
	12/2/99	9.91	10.1	0.19	95.24	85.14
EW-3	10/27/94	ND	10.05	0	95.78	85.73
	6/30/95	9.35	9.8	0.45	95.78	85.98
	9/21/95	10.92	11.08+	0.16	95.78	84.70
	7/11/96	8.53	8.64	0.11	95.78	87.14
	9/11/96	10.75	11.70	0.95	95.78	84.08
	11/5/96	Sheen	11.8	0	95.78	83.98
	7/17/97	9.13	9.33	0.2	95.78	86.45
	10/9/97	10.9	11.68	0.78	95.78	84.10
	6/25/98	8.78	9.43	0.65	95.78	86.35
	8/12/98	NM	11	0	95.78	84.78
	10/22/98	12.58	13.38	0.8	95.78	82.40
	3/18/99	9.03	9.23	0.2	95.78	86.55
	6/22/99	11.1	11.25	0.15	95.78	84.53
	9/16/99	10.76	11.06	0.3	95.78	84.72
	12/2/99	9.04	9.1	0.06	95.78	86.68

Table 1 - Avery Landing Groundwater and River Monitoring Data

Monitoring Location	Date	Depth to Product	Depth to Water	Product Thickness	T.O.C. Elevation	Groundwater Elevation
EW-4	10/27/94	ND	8.05	0	94.32	86.27
	6/30/95	7.84	7.85	0.01	94.32	86.47
	9/21/95	8.22	8.24	0.02	94.32	86.08
	7/11/96	Sheen	6.44	0	94.32	87.88
	11/5/96	Sheen	8.08	0	94.32	86.24
	7/17/97	Sheen	5.43	0	94.32	88.89
	10/9/97	Sheen	7.11	0	94.32	87.21
	6/25/98	5.28	5.3	0.02	94.32	89.02
	8/12/98	NM	8.98	0	94.32	85.34
	10/22/98	ND	8.98	0	94.32	85.34
	3/18/99	5.18	5.26	0	94.32	89.06
	6/22/99	Sheen	9	0	94.32	85.32
	9/16/99	8.45	9.27	0.82	94.32	85.05
	12/2/99	7.31	7.36	0.05	94.32	86.96
HC-1	10/27/94	ND	13.25	0	97.50	84.25
	6/30/95	ND	12.00	0	97.50	85.50
	9/21/95	NM	13.42	0	97.50	84.08
	7/11/96	ND	11.92	0	97.50	85.58
	9/11/96	ND	12.90	0	97.50	84.60
	11/5/96	Could not locate due to snow				
	7/17/97	ND	11.27	0	97.50	86.23
	10/9/97	ND	12.87	0	97.50	84.63
	6/25/98	ND	11.85	0	97.50	85.65
	8/12/98	NM	12.97	0	97.50	84.53
	10/22/98	ND	13.1	0	97.50	84.40
	3/18/99	ND	11.7	0	97.50	85.80
	6/22/99	ND	9.28	0	97.50	88.22
	9/16/99	ND	12.98	0	97.50	84.52
	12/2/99	Well Under Standing Water				
HC-4	10/27/94	13.3	15.34	2.04	98.94	83.60
	6/30/95	11.89	15.49	3.6	98.94	83.45
	9/21/95	13.67	NM	NM	98.94	85.27
	7/11/96	11.58	12.93	1.35	98.94	86.01
	9/11/96	13.53	13.93	0.40	98.94	85.01
	11/5/96	11.82	13.62	1.80	98.94	85.32
	7/17/97	11.65	13.25	1.60	98.94	85.69
	10/9/97	12.67	14.92	2.25	98.94	84.02
	6/25/98	11.53	12.49	0.96	98.94	86.45
	8/12/98	NM	13.9	NM	98.94	85.04
	10/22/98	10.3	14.7	4.40	98.94	84.24
	3/18/99	10.5	14.05	4.45	98.94	84.89
	6/22/99	16.9	13.9	4.00	98.94	85.04
	9/16/99	15.89	17.57	1.68	98.94	81.37
	12/2/99	10.84	11.84	1.00	98.94	87.10

Table 1 - Avery Landing Groundwater and River Monitoring Data

Monitoring Location	Date	Depth to Product	Depth to Water	Product Thickness	T.O.C. Elevation	Groundwater Elevation
HC-5	11/5/96	ND	11.22	0	97.95	86.73
	7/17/97	Monument under standing water				
	10/9/97	Monument under standing water				
	6/25/98	Lost during road construction				
MW-4	9/14/94	ND	12.88	0	99.76	86.88
	6/30/95	ND	10.19	0	99.76	89.57
	9/21/95	ND	11.95	0	99.76	87.81
	7/11/96	Sheen	10.18	0	99.76	89.58
	9/11/96	Sheen	11.33	0	99.76	88.43
	11/5/96	Lost during road construction				
MW-5	10/27/94	ND	10.45	0	97.76	87.31
	6/30/95	ND	9.13	0	97.76	88.63
	9/21/95	ND	10.83	0	97.76	86.93
	7/11/96	ND	8.98	0	97.76	88.78
	9/11/96	ND	10.71	0	97.76	87.05
	11/5/96	ND	10.65	0	97.76	87.11
	7/17/97	ND	8.75	0	97.76	89.01
	10/9/97	ND	10.89	0	97.76	86.87
	6/25/98	ND	8.56	0	97.76	89.20
	8/12/98	NM	10.68	0	97.76	87.08
	10/22/98	ND	13.5	0	97.76	84.26
	3/18/99	ND	8.8	0	97.76	88.96
	6/22/99	ND	6.44	0	97.76	91.32
	9/16/99	ND	10.8	0	97.76	86.96
	12/2/99	ND	9.82	0	97.76	87.94
MW-11	9/14/94	12	NA	NA	98.16	NA
	6/30/95	5.54	7.25	1.71	98.16	90.41
	7/11/96	6.34	10.00	3.66	98.16	88.16
	9/11/96	3.25	7.20	3.95	98.16	90.96
	11/5/96	3.05	7.20	4.15	98.16	90.96
	7/17/97	6.33	9.99	3.66	98.16	88.17
	8/12/98	NM	3.90	NM	98.16	94.26
	10/22/98	6.96	8.00	1.04	98.16	90.16
	9/16/99	Not Measured				
	12/2/99	6.9	7.37	0.47	98.16	90.79

Table 1 - Avery Landing Groundwater and River Monitoring Data

Monitoring Location	Date	Depth to Product	Depth to Water	Product Thickness	T.O.C. Elevation	Groundwater Elevation
P-1	10/27/94	ND	17.31	0	101.42	84.11
	6/30/95	ND	16.72	0	101.42	84.70
	9/21/95	ND	17.4	0	101.42	84.02
	7/11/96	ND	15.87	0	101.42	85.55
	9/11/96	ND	16.98	0	101.42	84.44
	11/5/96	ND	17.06	0	101.42	84.36
	7/17/97	ND	15.34	0	101.42	86.08
	10/9/97	ND	17.64	0	101.42	83.78
	6/25/98	ND	14.53	0	101.42	86.89
	8/12/98	NM	16.72	0	101.42	84.70
	10/22/98	ND	15.6	0	101.42	85.82
	3/18/99	ND	15.65	0	101.42	85.77
	6/22/99	ND	13	0	101.42	88.42
	9/16/99	ND	16.84	0	101.42	84.58
	12/2/99	ND	15.93	0	101.42	85.49
P-2	10/27/94	ND	15.87	0	100.06	84.19
	6/30/95	ND	15.26	0	100.06	84.80
	9/21/95	ND	16.04	0	100.06	84.02
	7/11/96	ND	14.52	0	100.06	85.54
	9/11/96	ND	15.62	0	100.06	84.44
	11/5/96	ND	15.08	0	100.06	84.98
	7/17/97	ND	13.92	0	100.06	86.14
	10/9/97	ND	16.09	0	100.06	83.97
	6/25/98	ND	15.95	0	100.06	84.11
	8/12/98	NM	15.3	0	100.06	84.76
	10/22/98	NM	16.95	0	100.06	83.11
	3/18/99	NM		0	100.06	86.02 ****
	6/22/99	ND	11.65	0	100.06	88.41
	9/16/99	ND	15.46	0	100.06	84.60
	12/2/99	ND	14.55	0	100.06	85.51
River at EW-1	10/27/94					83.12 *
	6/30/95					84.03 **
	9/21/95					82.24
	7/11/96					83.74 ***
	9/11/96					82.56
	11/5/96					83.16
	7/17/97					82.39
	10/9/97					83.00
	6/25/98					85.22
	8/12/98					85.42
	10/22/98					85.00
	3/18/99					83.93
	6/22/99					83.93
	9/16/99					78.28
	12/2/99					82.97

2296-07\Plc1299.xls - Monitoring Results

Table 1 - Avery Landing Groundwater and River Monitoring Data

Monitoring Location	Date	Depth to Product	Depth to Water	Product Thickness	T.O.C. Elevation	Groundwater Elevation
River at EW-2	10/27/94					84.41
	6/30/95					85.32
	9/21/95					83.53
	7/11/96					85.03
	9/11/96					83.85
	11/5/96					83.59
	7/17/97					85.35
	10/9/97					84.20
	6/25/98					86.42
	8/12/98					86.62
	10/22/98					86.20
	3/18/99					85.13
	6/22/99					85.13
	9/16/99					79.48
	12/2/99					84.17
River at EW-3	10/27/94					85.16 *
	6/30/95					86.07
	9/21/95					84.28
	7/11/96					85.78 ***
	9/11/96					84.60
	11/5/96					84.10
	7/17/97					86.31
	10/9/97					85.16
	6/25/98					85.16
	8/12/98					85.65
	10/22/98					85.23
	3/18/99					86.10
	6/22/99					89.45
	9/16/99					85.29
	12/2/99					85.13

Table 1 - Avery Landing Groundwater and River Monitoring Data

Monitoring Location	Date	Depth to Product	Depth to Water	Product Thickness	T.O.C. Elevation	Groundwater Elevation
River at EW-4	10/27/94					86.49 *
	6/30/95					87.40
	9/21/95					85.61
	7/11/96					87.11 ***
	9/11/96					85.93
	11/5/96					86.44
	7/17/97					87.27
	10/9/97					86.12
	6/25/98					88.34
	8/12/98					88.54
	10/22/98					88.12
	3/18/99					87.05
	6/22/99					90.40
	9/16/99					86.89
	9/16/99					86.09

Notes:

All measurements in feet.

* River elevation was extrapolated from the river surface slope measured in 1995 and the river elevation measured south of EW-2 in 1994.

** River elevation was extrapolated from river surface slope, based on river elevations measured south of EW-2, EW-3, and EW-4 in 1995.

*** River elevation was extrapolated from river surface slope, and the wood dock benchmark.

T.O.C. - Top of Casing

ND - Not Detected

NA - Not Available

NM - Not Measured

Avery Landing Fourth Quarter Groundwater Flow Dir



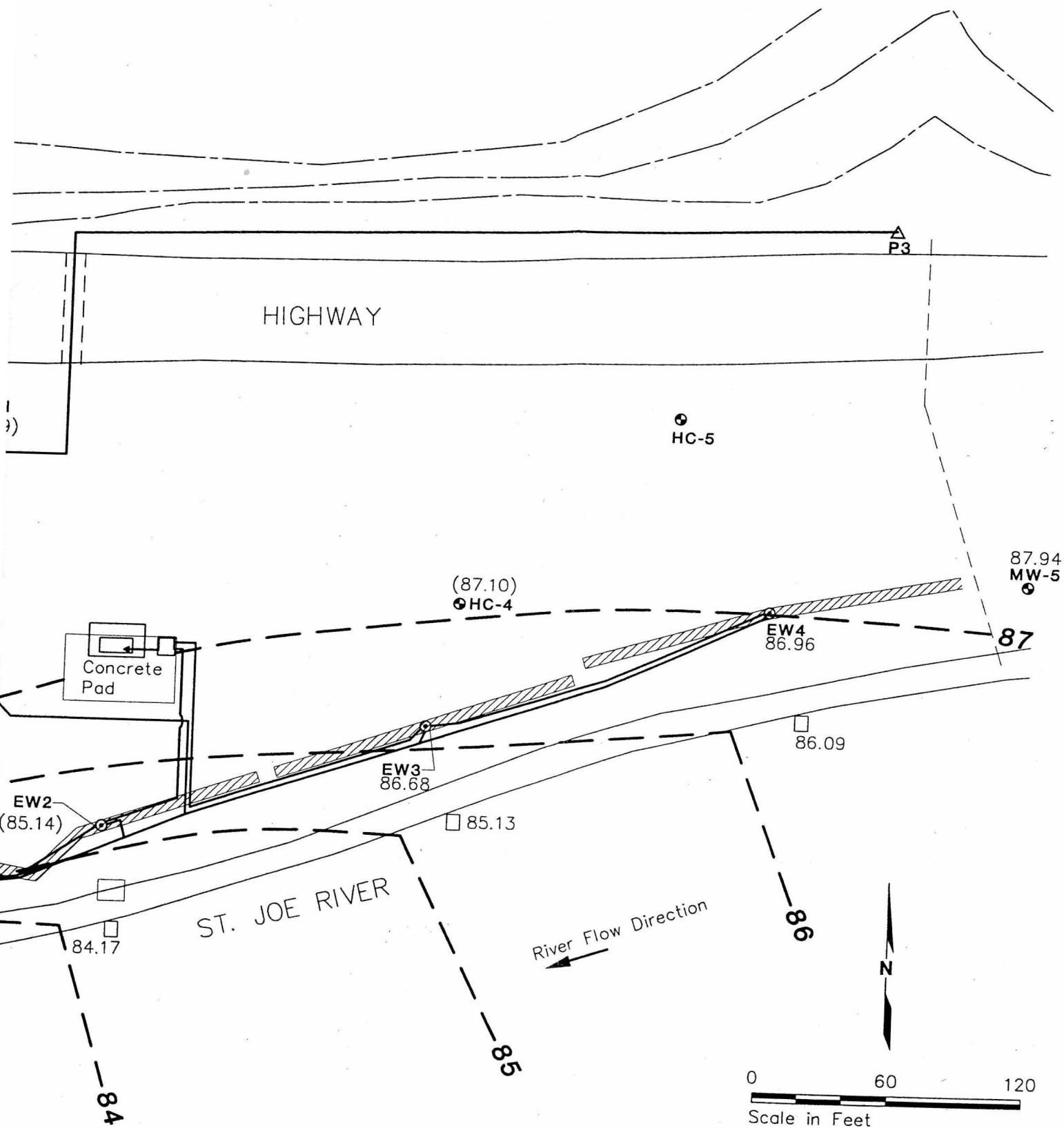
- MW-4 Monitoring Well Location and Number
- 83.79 Groundwater Elevation in Feet (12/99)
- (86.69) Corrected Groundwater Elevation due to Free Product in Feet (12/99)
- EW1 Extraction Well Location and Number
- △ P1 Piezometer Location and Number

□ 87.40

— 87 —



ction Map



Estimated River Elevation in Feet (12/99)
 Groundwater Elevation Contour in Feet
 Action Trench

Note: Elevation datum is southwest corner of Concrete Pad (100.00 feet)

HARTCROWSER
 J-2296-07 1/00
 Figure 1